

REMARKS

In view of both the amendments presented above and the following discussion, the Applicants submit that none of the claims now pending in the application is obvious under the provisions of 35 USC § 103. Thus, the Applicants believe that all of these claims are now in allowable form.

If, however, the Examiner believes that there are any unresolved issues requiring adverse final action in any of the claims now pending in the application, the Examiner should telephone Mr. Peter L. Michaelson, Esq. at (732) 530-6671 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Specification and abstract amendments

Various amendments have been made to the specification to correct minor inadvertent grammatical and formal errors that remained in the specification and abstract, as filed.

Rejections under 35 USC § 103

A. Claims 1-10

The Examiner has rejected claims 1-10, as they stood prior to this amendment, under the provisions of 35 USC § 103 as being obvious over the teachings in the Anderson et al patent (United States patent 5,963,255 issued October 5, 1999) in view of the Kare et al patent (United States patent 5,541,656 issued July 30, 1996). With respect

to the claims, as they now stand, this rejection is respectfully traversed.

For the sake of brevity, the Applicants will not repeat their discussion of the salient teachings of the Anderson et al patent, and instead will refer the Examiner back to the Applicants' previous amendment dated January 26, 2000 for that discussion. /

The Kare et al patent does indeed teach, as the Examiner has noted, a digital, specifically a CCD hand-held, camera. In an inactive state, the camera shuts down most functions to reduce power consumption. Furthermore, this camera, to the extent relevant and as the Examiner correctly recognizes, does not take a picture until flash charging has completed. In that regard, see col. 5, line 46 et seq. of this patent.

The Applicants' present invention, while also applicable for use in a digital camera, is fundamentally different from the teachings in the Anderson et al and Kare et al patents.

In particular, and as discussed in the Applicants' previous amendment, the Applicants have discovered that further power reductions can be obtained not by permitting simultaneous use of camera components during a power saving mode, but rather through successive use of one camera component at a time, while other components are powered off.

The Applicants have also recognized that in conventional cameras which employ power-saving, the image is

not recorded until AFTER the flash capacitor has completely charged. This clearly comports with the teachings which the Examiner specifically references in the Kare et al patent. Hence, a user does not know for certain whether an image has been captured and recorded until after the flash has completely charged, after which image recording occurs.

Unfortunately, this conventional approach suffers from a rather serious drawback.

Specifically, assume that a digital camera, powered by a battery, were to store an image after a flash capacitor has fully charged -- as the Kare et al patent appears to teach. As the Examiner can appreciate and as well known in the art, once charging commences, battery voltage will drop appreciably but will subsequently increase, typically linearly, as a flash capacitor continues to charge. Hence, if the battery voltage were relatively low prior to charging, then, it is quite possible given the additional power drain caused by charging, that the battery voltage could decrease, during charging, below a level sufficient for the internal memory within the camera to preserve its data contents. As such, under conditions of low battery power, the image data temporarily stored in internal RAM (random access memory) within the camera will simply be lost as soon as charging commences or, depending on remaining battery power, during charging. Thus, the image will not be recorded, e.g., permanently, in a non-volatile fashion on a suitable media.

Consequently, a user may later find that a picture (s)he thought was captured was in fact not -- simply because

the battery sufficiently exhausted its power while charging the flash. In this instance, the user would have no knowledge that the image was lost until (s)he tried to access it sometime later. Hence, depending on the circumstances involved, the user could well irretrievably lose a picture that could not easily, if at all, be re-taken; thus causing significant displeasure.

The Applicants have not only recognized this drawback; they have advantageously solved it.

In sharp distinction to the teachings of the Kare et al patent, the present invention both displays a captured image and permanently records it prior to a flash unit commencing its charge operation. As such, through the present invention, when the image is displayed, even during conditions of low battery power, that image will still have been recorded in a non-volatile fashion on the media -- even if during a subsequent flash charging operation the battery exhausts itself or just its voltage level drops to a low level insufficient to permit further camera operation. Consequently, through the present invention, the image is saved, not lost. Through use of the present inventive concepts, by the time the image is displayed and hence capable of being seen by a user, that image has already been recorded on a suitable recording media.

Moreover, through the invention, during conditions of low battery voltage, the monitor and the digital storage circuitry, and the flash are not operated simultaneously, but rather successively in a time-staggered fashion.

In that regard, whenever the battery voltage decreases below a threshold, e.g., 50% of a maximum value, the flash is turned off while a monitor displays image data and that image is compressed and permanently recorded. Only after that image has been completely recorded, is the monitor shut down and flash charging commenced. Since the monitor displays data and the image is recorded at one time, and the flash charges at another time, i.e., both are staggered with respect to each other (operate successively), the load on the camera battery is lessened over that which would occur if both components operated simultaneously, but the captured image is nevertheless advantageously preserved. To conserve power, these operations occur successively, but not both simultaneously. See, e.g., the present specification at page 20, line 7 et seq. and page 21, line 12 et seq.

Not only does this particular time-staggered operation contrast with the teachings in the Anderson et al patent, as discussed in the Applicants' prior amendment, but also the inventive teachings of permanently storing an image prior to commencing charging of a flash unit directly contravene the teachings in the Kare et al patent.

As the Examiner can readily appreciate, any combination of the teachings in these two cited patents would result in a camera that operates directly opposite to that which the Applicants now teach and which suffers the serious infirmity which the present invention solves!

Hence, it has remained for the Applicants and only the Applicants to have recognized and solved this problem.

Independent claim 1, as it now stands, contains suitable limitations directed to the distinguishing characteristics of the present invention. In that regard, this claim recites as follows, with those limitations shown in a bolded font:

"An electronic camera comprising:
a signal processing portion for processing an imaged video signal obtained from an imaging element to form image data;
a monitor for displaying said image data;
an electronic flash device;
a battery for supplying current to said signal processing portion, said monitor and said electronic flash device;
a battery voltage detector circuit;
and
a system controller; wherein said electronic flash device includes a capacitor charged when no light is emitted from the flash device, and a discharge tube which receives an output from capacitor and, in response thereto, emits light; and
said system controller receives an output from said battery voltage detector circuit, determines whether an amount of electric charge remaining in said battery is below a predetermined value, and controls displaying on said monitor and charging of said capacitor such that, when the amount of electric charge remaining in said battery is below said predetermined value, display of the image data and charging of the capacitor are not simultaneously performed and an operation of displaying and recording the image data is completed before an operation of charging the capacitor occurs."
[emphasis added]

Independent claim 7, as it now stands, contains very similar limitations to those in claim 1.

As such, the Applicants submit that neither claim 1 nor claim 7 is rendered obvious over the teachings in the Anderson et al and Kare et al patents, whether taken singly or in any combination, including that posed by the Examiner. Hence, both of the claims are patentable under the provisions of 35 USC § 103.

Each of dependent claims 2-9 depends, either directly or indirectly, from claims 1 or 7, and recites further distinguishing characteristics of the present invention. As such, each of these dependent claims is not rendered obvious in view of the teachings in these references for the exact same reasons set forth above. Hence, each of these dependent claims is also patentable under the provisions of 35 USC § 103.

B. Claims 11 and 12

The Examiner has rejected claims 11-12, as they stood prior to this amendment, under the provisions of 35 USC § 103 as being obvious over the teachings in the Anderson et al patent in view of the Kare et al patent and further in view of the Tanaka et al patent (United States patent 5,155,581 issued October 13, 1992). This rejection is also respectfully traversed.

The Tanaka et al patent discloses the concept, as the Examiner correctly notes, of an electronic still video camera in which a floppy disk spindle motor is stopped while

a flash unit is charging. Obviously, proceeding in this manner prevents an image from being recorded on a floppy disk until after the flash has fully charged, i.e., if a disk spindle does not turn, the media itself does not rotate; hence, precluding image data from being recorded on it. These teachings are entirely consistent with those in the Kare et al patent, which, as the Examiner has noted, teaches the concept of preventing the camera from recording an image until after its flash unit has fully charged -- teachings which directly contravene those of the present Applicants.

Hence, any combination of the teachings in these three patents would again result in a camera that operates directly opposite to that which the Applicants now teach and which suffers the serious infirmity which the present invention solves!

Independent claim 11, as it now stands, contains suitable limitations directed to the distinguishing characteristics of the present invention. In that regard, this claim recites as follows, with those limitations shown in a bolded font:

"An electronic camera comprising:
 an operation key;
 a signal processing portion for
processing an imaged video signal
obtained from an imaging element to form
image data and storing said image data
on a recording medium in response to
operation of said shutter key;
 a monitor for displaying said image
data thereon;
 an electronic flash device;

a battery for supplying current to said signal processing portion, said monitor and said electronic flash device;

a battery voltage detector circuit connected to said battery; and

a system controller connected to said battery voltage detector circuit, said monitor, said signal processing portion and said electronic flash device;

wherein:

said electronic flash device has a capacitor charged with current supplied from said battery when said electronic flash does not emit a flash of light, and a discharge tube which receives an output from said capacitor and, in response thereto, produces the flash of light; and

said system controller receives an output from said battery voltage detector circuit and determines whether a remaining amount of electric charge in the battery is below a predetermined value, and, if the remaining amount of the charge is below the predetermined value, does not permit displaying on said monitor and charging of said capacitor to occur simultaneously, such that the system controller prevents the capacitor from being charged while the monitor is displaying the image data when one screen of the image data is being recorded on the recording medium, and controls the monitor to be inoperative while said capacitor is being charged after one screen of said image data has been completely recorded on the recording medium."[emphasis added]

As such, the Applicants submit that claim 11 is not rendered obvious over the teachings in the Anderson et al and Kare et al and Tanaka et al patents, whether taken

singly or in any combination, including that posed by the Examiner. Hence, this claims is patentable under the provisions of 35 USC § 103.

Dependent claim 12 directly depends from claim 11 recites further distinguishing characteristics of the present invention. As such, claim 12 is not rendered obvious in view of the teachings in these references for the exact same reasons set forth above. Hence, this dependent claim is also patentable under the provisions of 35 USC § 103.

Conclusion

Thus, the Applicants submit that none of the claims, presently in the application, is obvious under the provisions of 35 USC § 103.

Consequently, the Applicants believe that all these claims are presently in condition for allowance. Accordingly, both prompt examination of this application and its swift passage to issue are earnestly solicited.

Respectfully submitted,

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